

1 1. In a computer system environment having at least one software component
2 and at least one peripheral hardware device, a method for dynamically offloading, on a per-
3 packet basis and depending on the then current needs of the computer system, an operating
4 task from the software component to the peripheral hardware device thereby freeing up
5 host processor resources and increasing the overall efficiency of the computer system, the
6 method comprising:

7 a step for enabling selected task offload capabilities of the peripheral
8 hardware device to the extent such selected task offload capabilities are needed for
9 one or more packets; and

10 in the event that an operating task to be performed for a packet by the
11 software component corresponds to an enabled task offload capability on the
12 peripheral hardware device, and depending on the then current needs of the
13 computer system, performing the act of selectively offloading the operating task
14 from the software component to the peripheral hardware device by sending a data
15 packet to the peripheral hardware device indicating that the peripheral hardware
16 device perform the specified operating task, the operating task being a task that
17 peripheral hardware device is capable of performing.

18 2. A computer-readable medium having computer-executable instructions for
19 performing the step and act recited in claim 1.
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21 3. A method as recited in claim 1, wherein the peripheral hardware device is a
22 network interface card (NIC) that is operatively connected to the computer system.
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4. A method as recited in claim 3, wherein the data packet sent to the NIC indicates that the NIC is to perform the specified operating task on the data packet sent to the NIC, the data packet sent to the NIC for dispatch on a network.

5. A method as recited in claim 3, wherein the data packet sent to the NIC indicates that the NIC is to perform the specified operating task on a data packet received by the NIC from the network.

6. A method as recited in claim 1, wherein the software component is a network software application executing in a layered network model.

7. A method as defined in claim 1, wherein the selected task offload capabilities of the peripheral hardware device are enabled by setting at least one flag indicator in a task offload buffer associated with the peripheral hardware device.

8. A method as defined in claim 1, wherein the packet is a network data packet comprising network data and packet extension data, wherein the packet extension data is comprised of at least one data field indicative of at least one operating task to be performed by the peripheral hardware device.

9. A method as defined in claim 8, wherein the peripheral hardware device is a Network Interface Card (NIC).

1 10. A method as defined in claim 1, wherein the operating task is selected from
2 one or more of the following operating tasks: a checksum operation; an encryption
3 operation; a message digest calculation operation; a TCP segmentation operation; a UDP
4 segmentation operation; a decryption operation; a TCP packet assembly operation; a UDP
5 packet assembly operation; a packet classification operation; and a Denial of Service filter
6 operation.

1 11. In a computer system environment having at least one software component
2 and at least one peripheral hardware device, a method for dynamically offloading, on a per-
3 packet basis and depending on the then current needs of the computer system, an operating
4 task from the software component to the peripheral hardware device thereby freeing up
5 host processor resources and increasing the overall efficiency of the computer system, the
6 method comprising:

7 the act of the software component communicating with the peripheral
8 hardware device to enable task offload capabilities on the peripheral device needed
9 for one or more packets; and

10 in the event that an operating task to be performed for a packet by the
11 software component corresponds to an enabled task offload capability on the
12 peripheral hardware device, and depending on the then current needs of the
13 computer system, performing the act of selectively offloading the operating task
14 from the software component to the peripheral hardware device by sending a data
15 packet to the peripheral hardware device indicating that the peripheral hardware
16 device perform the specified operating task, the operating task being a task that
17 peripheral hardware device is capable of performing.

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19 12. A computer-readable medium having computer-executable instructions for
20 performing the acts recited in claim 11.

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22 13. A method as recited in claim 11, wherein the peripheral hardware device is
23 a network interface card (NIC) that is operatively connected to the computer system.
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1 14. A method as recited in claim 13, wherein the data packet sent to the NIC
2 indicates that the NIC is to perform the specified operating task on the data packet sent to
3 the NIC, the data packet sent to the NIC for dispatch on a network.
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5 15. A method as recited in claim 13, wherein the data packet sent to the NIC
6 indicates that the NIC is to perform the specified operating task on a data packet received
7 by the NIC from the network.
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9 16. A method as recited in claim 11, wherein the software component is a
10 network software application executing in a layered network model.
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12 17. A method as defined in claim 11, wherein the selected task offload
13 capabilities of the peripheral hardware device are enabled by setting at least one flag
14 indicator in a task offload buffer associated with the peripheral hardware device.
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16 18. A method as defined in claim 11, wherein the packet is a network data
17 packet comprising network data and packet extension data, wherein the packet extension
18 data is comprised of at least one data field indicative of at least one operating task to be
19 performed by the peripheral hardware device.
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21 19. A method as defined in claim 11, wherein the operating task is selected
22 from one or more of the following operating tasks: a checksum operation; an encryption
23 operation; a message digest calculation operation; a TCP segmentation operation; a UDP
24 segmentation operation; a decryption operation; a TCP packet assembly operation; a UDP

1 packet assembly operation; a packet classification operation; and a Denial of Service filter
2 operation.

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1 20. A computer-program product for use in a computer system environment
2 having at least one software component and at least one peripheral hardware device, the
3 computer-program product for implementing a method for dynamically offloading, on a
4 per-packet basis and depending on the then current needs of the computer system, an
5 operating task from the software component to the peripheral hardware device thereby
6 freeing up host processor resources and increasing the overall efficiency of the computer
7 system, the computer-program product including a computer-readable medium having
8 stored thereon computer-executable instructions for performing the following:

9 an act of communicating with the peripheral hardware device to enable task
10 offload capabilities on the peripheral device needed for one or more packets; and

11 in the event that an operating task to be performed for a packet by the
12 software component corresponds to an enabled task offload capability on the
13 peripheral hardware device, and depending on the then current needs of the
14 computer system, performing the act of selectively offloading the operating task
15 from the software component to the peripheral hardware device by causing a data
16 packet to be sent to the peripheral hardware device indicating that the peripheral
17 hardware device perform the specified operating task, the operating task being a
18 task that peripheral hardware device is capable of performing.

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20 21. A computer-program product as recited in claim 20, wherein the computer-
21 readable media is one or more physical storage media.

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